

Low-Cost Biocatalyst for Acceleration of Energy Efficient CO₂ Capture

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Other factors that could materially affect actual results, levels of activity, performance or achievements can be found in Codexis’ Annual Report on Form 10-K dated Feb 20, 2011, including under the caption “Risk Factors.” If any of these risks or uncertainties materialize, or if our underlying assumptions prove to be incorrect, actual results, levels of activity, performance or achievement may vary significantly from what we projected.

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About Codexis, Inc.

- World leader in creating 'super enzymes' through *Directed Evolution*
- 100's of Directed Evolution patents
- Presidential Green Chemistry Awardee 2006 and 2010
- Partner with Shell in biofuels
- ~300 employees California, Hungary and Singapore
- NASDAQ (CDXS)
- Revenues >\$100 million for 2010

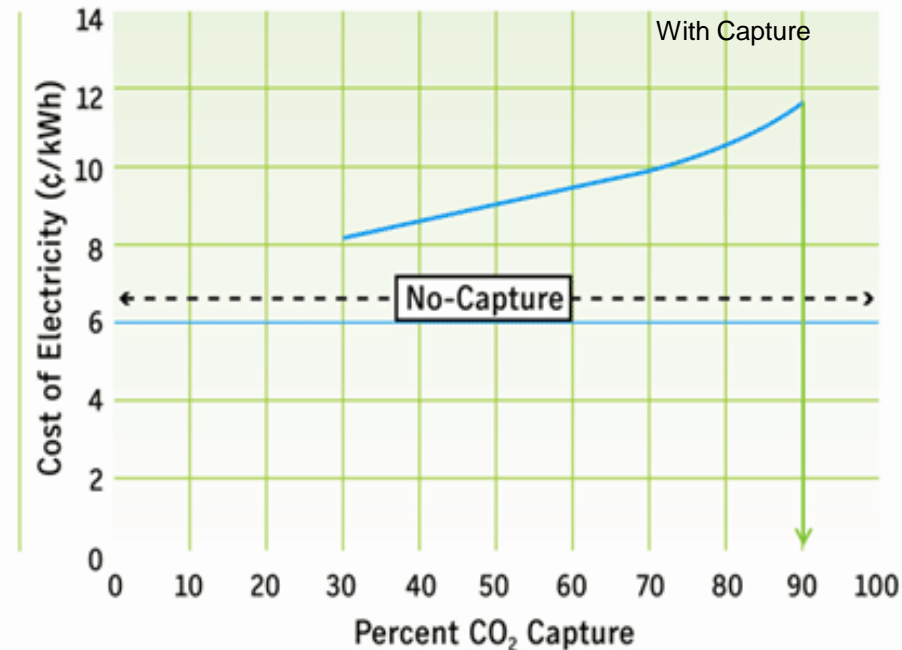


Current CO₂ capture methods are too costly

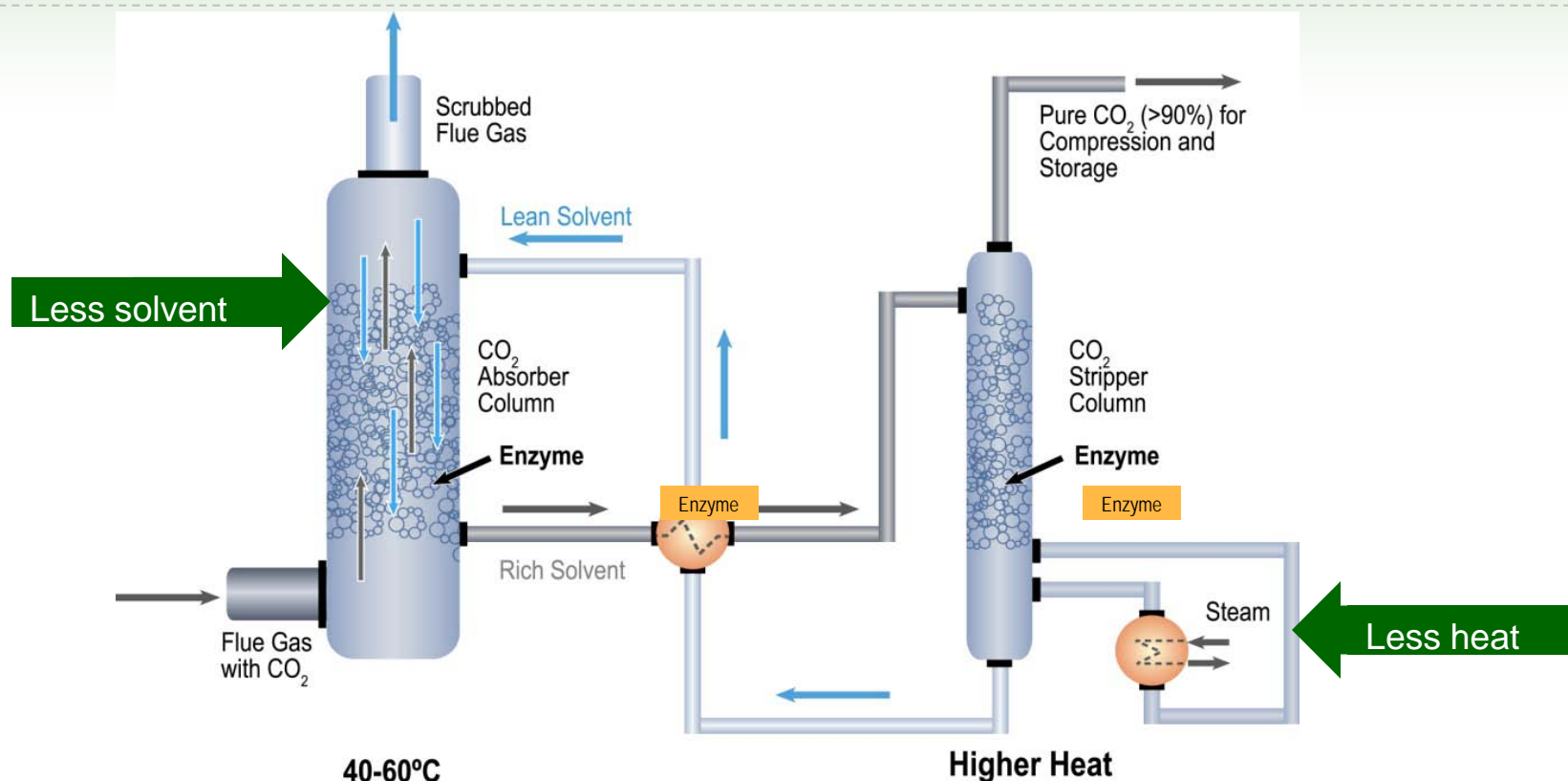
Existing solvent technologies

- Benefit: Proven, available
- Challenges:
 - Parasitic energy loss high
 - \$60-80 / ton CO₂ removal cost
 - COE nearly doubles with capture
 - Complex, high capex

COST OF ELECTRICITY (COE) IMPACT
OF CONVENTIONAL CO₂ CAPTURE

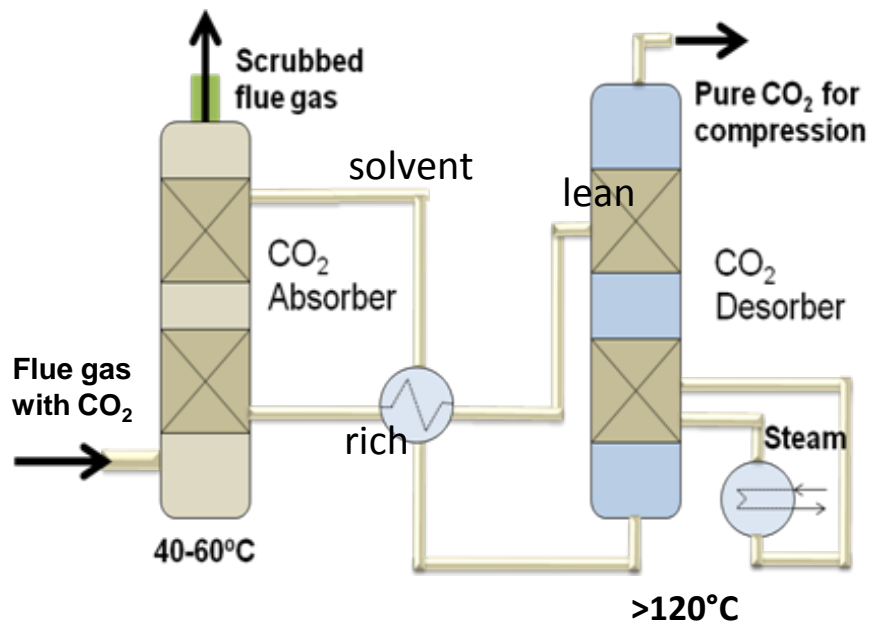


Enable energy efficient solvents with enzymes



- Custom enzymes allow use of energy efficient solvents
- Enzyme+solvent requires much less heat to release CO₂
- Potential to lower increase LCOE from 80% to $\leq 35\%$

Project targets

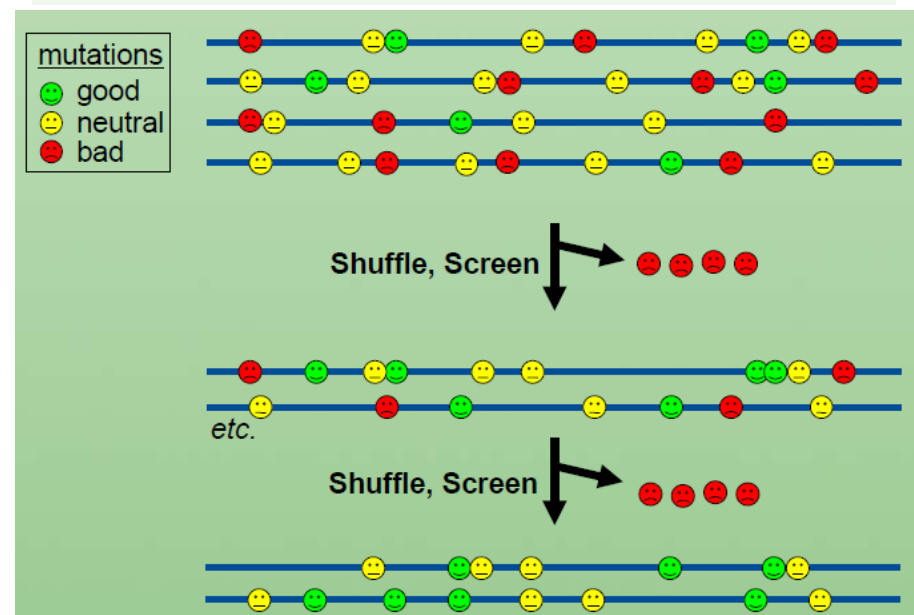
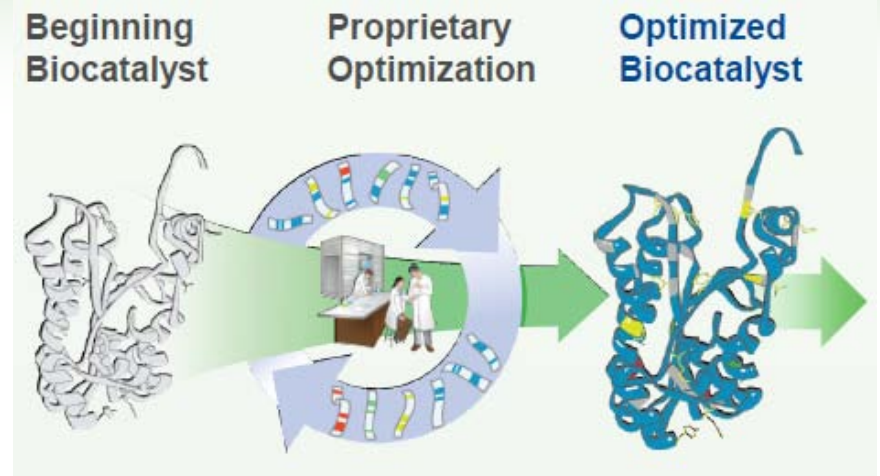


Performance Targets :

- ✓ Highly active,
- Thermostability ($\geq 125^\circ\text{C}$),
- ✓ pH from >11 to 8,
- ✓ High solvent tolerance (5M amine),
- Stability to degradants, flue gas components etc.,
- Economical production of biocatalyst

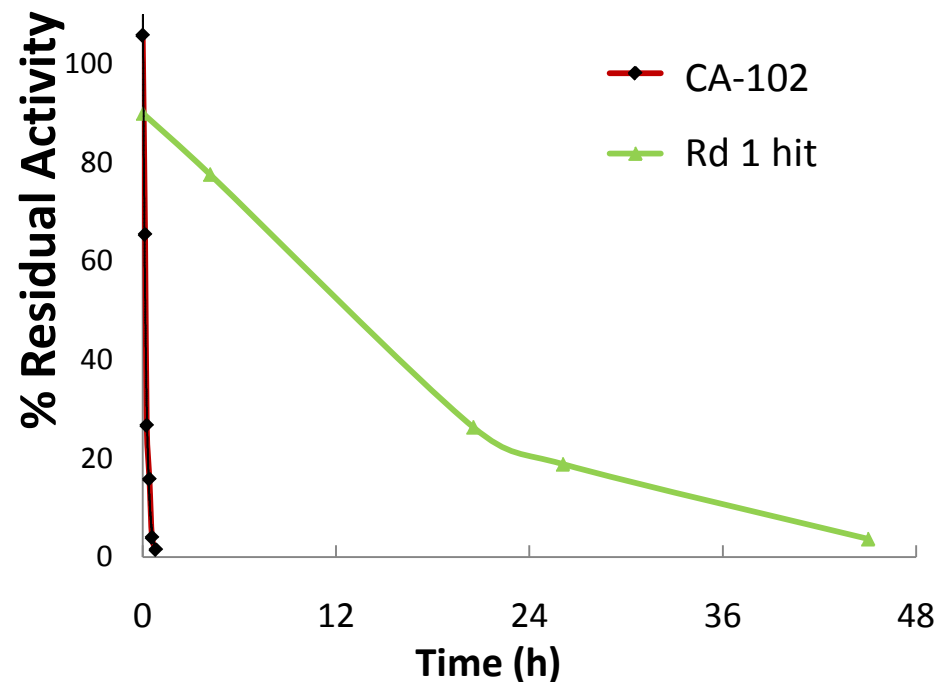
Directed Evolution technology

- Codexis technology to design and manufacture enzymes which vastly outperform native enzymes
- Screening identifies new enzymes with beneficial mutations and without detrimental ones out
- Validated by success in pharma and biofuels

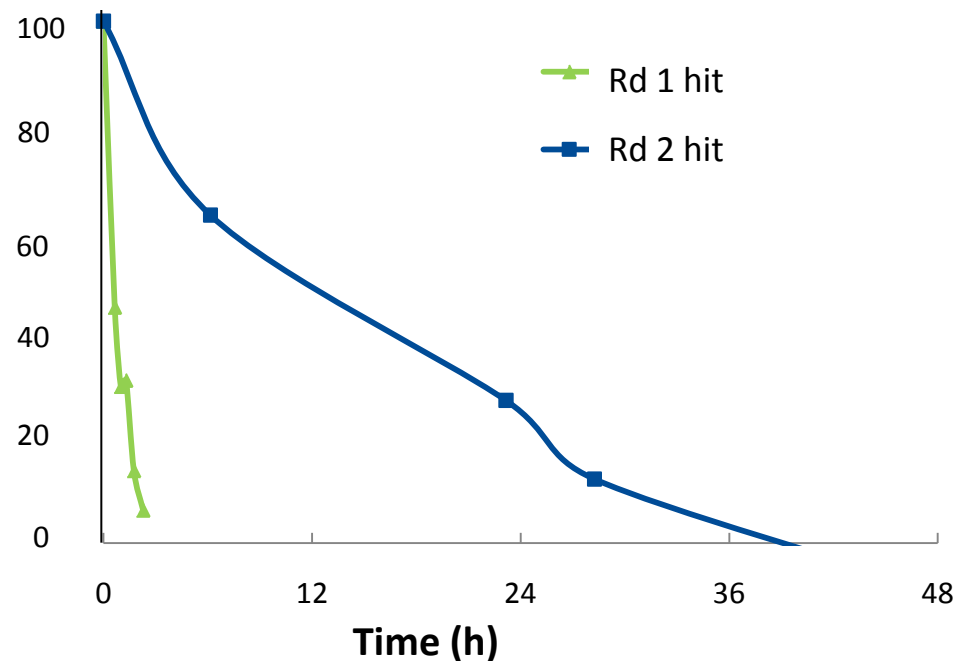


Evolving stability of CA for process conditions

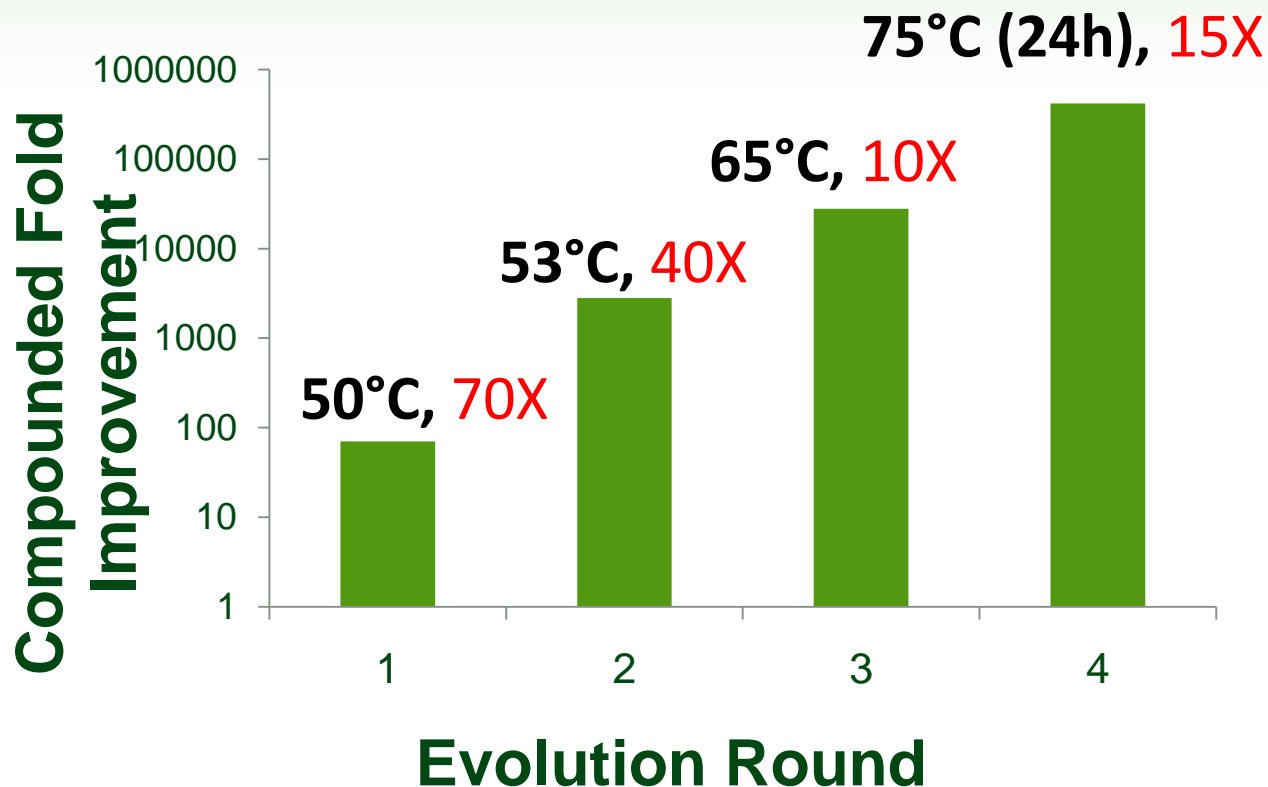
Stability of CA Evolvants from Round 1 in 3 M MDEA at 50°C



Stability of CA Evolvants from Round 2 in 4.2 M MDEA at 55°C



Directed evolution of biocatalyst for 50% MDEA



- 4 Rounds of evolution on thousands of variants
- Thermostability increased by >100,000-fold, half-life (24h) increased ca. 45 °C

Acknowledgement

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